

CLAIMS

What is claimed is:

1 1. An apparatus comprising a plurality of switches each having a first input
2 terminal, a second input terminal, a first output terminal and a second output terminal,
3 each of the plurality of switches having a pass-through state in which data input to the
4 first input terminal is passed to the first output terminal and data input to the second input
5 terminal is passed to the second output terminal, and a cross-over state in which data
6 input to the first input terminal is passed to the second output terminal and data input to
7 the second input terminal is passed to the first output terminal, the plurality of switches
8 interconnected to provide, at the output terminals of the plurality of switches,
9 permutations of signals received via the input terminals of the plurality of switches.

1 2. The apparatus of claim 1 wherein one or more of the plurality of switches
2 has a broadcast state in which data input to the one of the first input terminal and the
3 second input terminal is passed to the first output terminal and to the second output
4 terminal.

1 3. The apparatus of claim 1 wherein the plurality of switches comprises 352
2 switches coupled as 32 by 11 array to provide a 64-bit Benes fabric.

1 4. The apparatus of claim 1 wherein one or more of the plurality of switches
2 comprises:

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3 a first multiplexer coupled to the first input terminal an to the second input
4 terminal to receive signals from the first input terminal and the second input terminal, the
5 first multiplexer to pass signals from the first input terminal and the second input terminal
6 to the first output terminal; and
7 a second multiplexer coupled to the first input terminal an to the second input
8 terminal to receive signals from the first input terminal and the second input terminal, the
9 second multiplexer to pass signals from the first input terminal and the second input
10 terminal to the second output terminal.

1 5. The apparatus of claim 4 further comprising a control line to provide a
2 control signal to the first multiplexer and to the second multiplexer such that when the
3 control signal is in a first state the first multiplexer passes signals from the first input
4 terminal to the first output terminal and the second multiplexer passes signals from the
5 second input terminal to the second output terminal and when the control signal is in a
6 second state the first multiplexer passes signals from the second input terminal to the first
7 output terminal and the second multiplexer passes signals from the first input terminal to
8 the second output terminal.

1 6. The apparatus of claim 1, wherein the plurality of switches are
2 independently configurable.

1 7. The apparatus of claim 1 further comprising control circuitry coupled to
2 the plurality of switches, the control circuitry to configure the plurality of switches.

1 8. A method comprising:

2 receiving a set of bits;

3 passing the set of bits through multiple layers of switches, wherein each of the

4 switches operates in a pass-through state in which data input to the first input terminal is

5 passed to the first output terminal and data input to the second input terminal is passed to

6 the second output terminal, or a cross-over state in which data input to the first input

7 terminal is passed to the second output terminal and data input to the second input

8 terminal is passed to the first output terminal, the switches interconnected to provide

9 multiple permutations of signals input to the plurality of switches; and

10 outputting a permuted version of the set of bits.

1 9. The method of claim 8 wherein the switches comprise 352 switches

2 coupled as 32 by 11 array to provide a 64-bit Benes fabric.

1 10. The method of claim 8 further comprising providing a control signal to

2 each of the switches, wherein the control signal causes the switches to be in either the

3 pass-through state or the cross-over state.

1 11. The method of claim 10 wherein the control signals are retrieved from a

2 control register.